

A Technique to Address Peritoneal Dialysis Catheter Malfunction

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ABSTRACT

Background: A 66-year-old male with a history of severe ischemic myopathy and renal failure underwent a combined heart and kidney transplant. Postoperative failure of the transplanted kidney eventually led to the need for peritoneal dialysis (PD).

Methods: After one month, the PD catheter was laparoscopically repositioned after it was found to have migrated from its correct position in the pelvis and twisted and clogged in the omentum. After one more month, the same complication recurred. Laparoscopy was again used to clear the clogged catheter and reposition it. This time, a testicular prosthesis was sewn to the catheter and used as an anchoring weight for the proper position in the pelvis.

Results: Six months after anchoring with the testicular prosthesis, the peritoneal dialysis catheter continues to function appropriately, and the patient has no complaints.

Conclusions: Mal-positioned peritoneal dialysis catheters may be repositioned and anchored by using a testicular prosthesis in the event that weighted catheters are not available.

Key Words: Peritoneal dialysis, Catheter, Migration, Laparoscopy.

INTRODUCTION

Peritoneal dialysis (PD) is a dialysis modality used in renal failure patients with poor vascular access or hemodynamic instability. It is also used for patients who prefer home dialysis but cannot perform home hemodialysis due to lack of adequate support services.¹ Common methods for placement of PD catheters include peritoneoscope-assisted laparoscopy, dissection to the peritoneal cavity using mini-laparotomy, fluoroscopy-guided placement, or blind percutaneous placement using a modified Seldinger technique.² PD catheters fail for a variety of reasons, the most frequent being infection. Other complications include outflow failure, pericatheter leak, abdominal wall herniation, catheter cuff extrusion, and intestinal perforation.^{1,3} Outflow failure may result from constipation/obstipation, catheter malposition, intraluminal catheter occlusion, extraluminal catheter occlusion, or catheter kinking, and the incidence ranges from 5% to 20%.^{3,4} Catheter failure usually occurs within the first month after placement with malpositioning and omental occlusion occurring in the first few days or weeks, respectively.^{4,5} The diagnosis of outflow failure is made when incomplete recovery of the instilled dialysate occurs. Clinical manifestations include irregular outflow, incomplete response to dialysis as seen by persistently elevated serum creatinine or potassium or pain. Treatment of outflow failure may require surgical intervention or replacement of the PD catheter. In the case of occlusion, an adhesiolysis or omentectomy may be required. Each invasive therapy places the patient at increased risk for infection.

CASE REPORT

A 66-year-old male with a history of severe ischemic cardiomyopathy and renal failure underwent a combined heart and kidney transplant. His postoperative course was complicated by failure of the transplanted kidney. Hemodialysis, initiated prior to the transplant, was continued postoperatively. Attempts were made to convert the patient to continuous dialysis for intermittent weekly dialysis runs; however, due to hemodynamic instability, he was incompatible with this modality. Therefore, he underwent laparoscopic placement of a peritoneal hemodialysis catheter.

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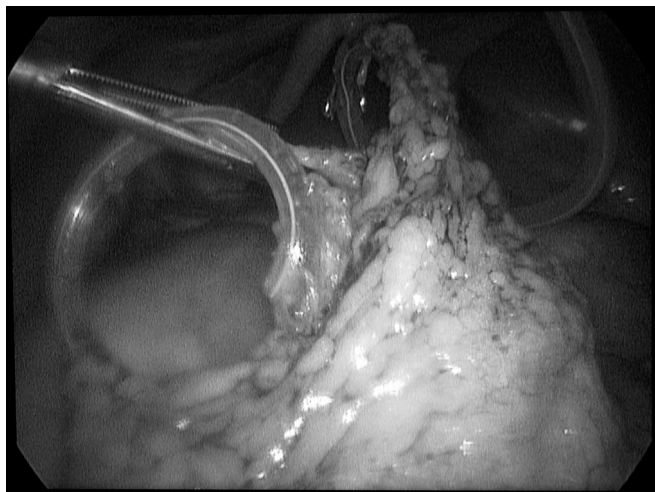


Figure 1. Peritoneal dialysis catheter intertwined in omentum.

Initially, the patient tolerated peritoneal dialysis without complication. One month after the placement of the catheter, the dialysate return had significantly diminished. Investigation using radiographic imaging showed the PD catheter had migrated to the upper abdomen. The patient then underwent laparoscopic repositioning of the PD catheter. During this procedure, the catheter was found to be wrapped in omentum and clogged with omental debris. It was brought out of the abdomen and thoroughly flushed until completely clean. The catheter was then reintroduced into the abdomen and placed under direct visualization in the retrovesical space. Also under direct visualization, the catheter was seen appropriately draining the 1 liter of normal saline/heparin solution that had been placed into the peritoneal space.

One month after its repositioning, the PD catheter was once again found to have diminished return of dialysate. Radiographic imaging again showed the position of the catheter to be in the upper abdomen. The patient was taken back to the operating room for attempted fixation of the PD catheter. After insufflation with a Veress needle in the left upper quadrant, a 5-mm Optiview trocar was placed in the same location. Three additional trocars were placed in the supraumbilical, left lower quadrant, and suprapubic regions. Inspection of the abdomen showed the PD catheter intertwined in the omentum (**Figure 1**). The catheter was freed from the omentum and pulled through the suprapubic port. It was then cleaned and vigorously flushed with normal saline. By using a Prolene stitch, a testicular prosthesis was then attached to the end of the catheter to act as a weight to keep the catheter in the appropriate position in the pelvis (**Figures 2**). The

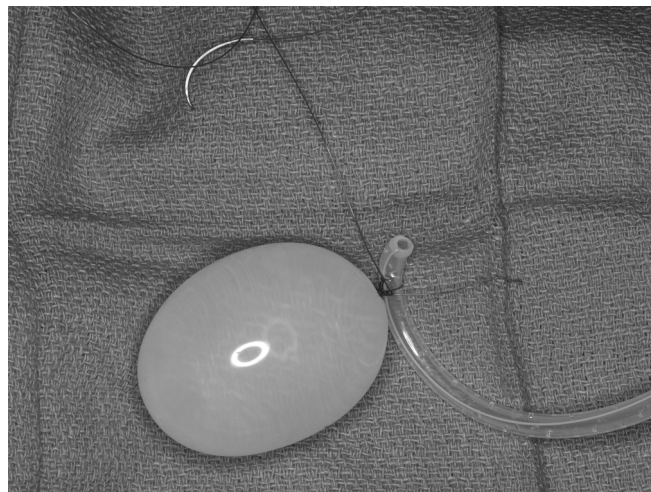


Figure 2. Testicular prosthesis attached to catheter.



Figure 3. Catheter and testicular prosthesis placed in abdomen through suprapubic port site.

catheter and prosthesis were replaced into the abdomen after extending the suprapubic port site to 3cm (**Figure 3**), and the catheter was then fixed to the bladder by using a 0 Silk interrupted suture. The anterior fascia was closed, and the abdomen was reinsufflated. The PD catheter/prosthesis complex was placed in the pelvis (**Figure 4**). Flow through the catheter was confirmed before the operation was completed. Six months after this procedure, the PD catheter was still in the correct position and functioning appropriately.

DISCUSSION

Placement of PD catheters using laparoscopy is a well-established technique. Repositioning of a displaced PD

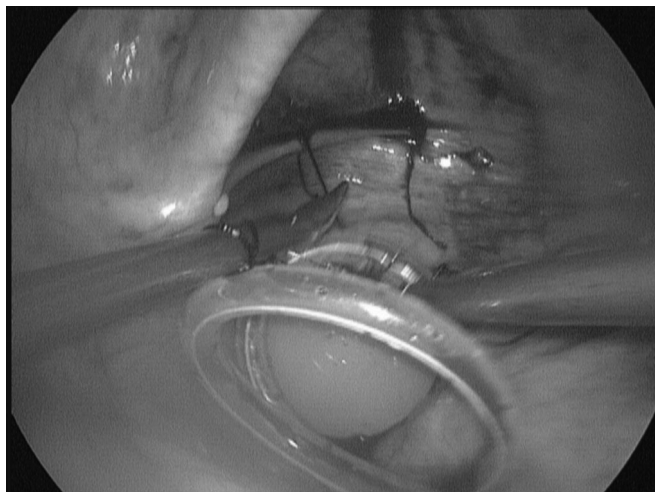


Figure 4. Peritoneal dialysis catheter / prosthesis complex being placed in pelvis.

catheter or adhesion resection via laparoscopy has been previously described.^{6,7} However, these series describe high rates of repeat malfunctioning requiring either removal of the catheter or return to the operating room for another repositioning. Our laparoscopic approach to repositioning utilizes a readily available, inexpensive testicular prosthesis that has been proven safe for *in situ* use.⁸ This approach ensures stable positioning of the catheter by utilizing the prosthesis as an anchor.

A group in Italy (Di Paolo et al)⁹ has developed a weighted PD catheter that incorporates 12 grams of tungsten into the tip of the conventional Tenckhoff catheter. The use of this catheter has been shown to reduce the incidence of catheter migration, thereby reducing the need for further catheter manipulation and catheter-associated infections, as well as reduce the transfers to hemodialysis, rates of peritonitis, and leak compared with conventional PD catheters.^{9,10} This self-locating catheter would be the preferred initial device to use in our patient. However, due to both cost and availability, it is not always an option. Also, because there were no signs of infection

associated with the patient's indwelling PD catheter, it was felt safe to proceed with repositioning rather than replacement.

The technique described was well tolerated by the patient and no complication occurred. This novel technique has resulted in a properly functioning peritoneal dialysis catheter without the need for replacement.

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